of the third-book method, I can readily show that such an inference was by no means so absurd as might be inferred from his remarks about the oldness of the problem. For I remember distinctly an occasion on which the solution of this problem was required during a lecture at King's College, London, at which my friends Baily (second wrangler in 1860) and Hudson (third wrangler in 1861) were present. Three of the students at once submitted to the lecturer the solution by the sixth-book method (which no one can well miss), and the lecturer (a second wrangler), while admitting that the solution was not very pleasing, was unable at the moment to suggest a better; he added, jokingly, that the best way to solve the problem would be to describe a parabola having the given point as focus and either of the given lines as directrix. Now, he had not been long engaged in teaching, and it may be perfectly true that one who had been so engaged "would certainly have in his memory one or more solutions of this problem;" but this would depend on the subjects he had been engaged upon. If he chanced to be one of the most eminent mathematical professors at Cambridge, it is probable that no problem in the higher analysis would be unknown to him, but the odds would be rather against than in favour of his being familiar with the best solutions of geometrical problems, just as the odds would be against his being proficient in the rules for "Barter," "Tare and Trett," and "Alligation Partial."

From letters which have reached me I find that the general purport of my letter has been misapprehended, since some appear to infer that I question the geometrical power of our University mathematicians. I meant nothing so unreasonable. We have geometricians who rival (and I believe more than rival) in power the best Continental geometricians. But their geometrical strength has not been attained during their University career; and no one who considers carefully the mathematical course at either University, can believe that it tends either to form geometricians or to foster geometrical taste.

I candidly admit that I do not speak of either course from personal experience. All I know of geometry was learned before my Cambridge time, and very nearly all I know of analytical mathematics was learned after that time. But I know quite well the nature of each course, and can sustain my statement that our universities do not encourage the study of geometry. Whether they should do so is a matter on which I have expressed no opinion.

RICHD. A. PROCTOR

Brighton, Oct. 7

P.S.—Mr. Todhunter refers to the actual solution of the problem as a "matter of some interest, though of course unconnected with the theoretical solution." As I have had some experience in constructive geometry (having always made it a practice to solve astronomical problems constructively before proceeding to numerical calculation), I may be permitted to make some remarks on this point. First I would add to the compasses and parallel ruler (the only instruments mentioned by Mr. Todhunter) that most useful instrument the square. With this instrument (which would be needed in any case) the following construction would be as convenient as the one founded on the sixth-book solution. The problem, be it remembered, requires that a circle should be described through a given point to touch two given straight lines. Let P be the point, AB and AFCG the lines, AHDK the bisector of BAC (this bisector must be drawn in both methods, so that I leave its construction untouched); with the square draw CPD square to AK, and PE square to CD; with centre D draw circular arc PE; with centre C and distance PE draw half circle FLG; then FH and GK drawn square to AG (with the square) are radii of the two circles fulfilling the conditions

Prof. Newcomb and Mr. Stone

IN Mr. Proctor's letter to NATURE of the 23rd ult., he remarks that Prof. Newcomb had stated to him that he was bewildered at having a discussion of the transits of Venus and the parallax of the Sun, deducible from them, prior to that of Mr. Stone, attributed to himself; and Mr. Proctor goes on to state that he was justified in his belief that such a discussion had been made because a writer, signing himself "P. S." had asserted that it had in a letter appearing in the *Astronomical Register* for December 1868. He further gives two reasons for the unhesitating credit which he had given to the assertion of "P. S." The first of them is that there is strong internal evidence that the writer was a distinguished astronomer having those as his initials (or a part of his initials, it would be more correct to say); of this it seems scarcely needful to say more, as the writer in question may prefer not to be unearthed. But of Mr. Proctor's other reason, may I be permitted to say a word? It is that the assertion of "P. S." was "permitted to remain uncorrected."

Had Mr. Proctor turned to the very next number of the *Astronomical Register* (that for January 1869) he would have found a letter signed also with initials "W. T. L." in which "P. S.'s" assertion that Prof. Newcomb had published any discussion of the transit of Venus in 1769, is most emphatically contradicted. "P. S.," it is true, made a rejoinder in the March number of the *Register* (page 65) but in it he neither denies "W. T. L.'s" contradiction, nor refers (as of course he could not) to any original investigation of the transit-of-Venus problem by Prof. Newcomb. He contented himself with the rather unintelligible remark that "W. T. L.'s" answer was not in "the spirit of the age we live in." The latter writer in the following number of the *Register* (page 88) pointed how, in all probability, the mistake of "P. S." had arisen from misunderstanding part of the title of a paper by Prof. Newcomb on the Distance of the Sun, and the matter dropped.

Now, as Prof. Newcomb was as likely to have seen "W. T. L.'s" contradiction as "P. S.'s" assertion, there would certainly seem no necessity for his further disowning himself what "P. S." had claimed for him.

W. T. LYNN

Blackheath, Oct. 2

Note on the Cycloid

I DO not know whether it has been noticed that the cycloid is a projection of the common helix (thread-inclined 45°). I suppose the property must have long since been recognised, but have not seen it mentioned.

The proof is very simple, and may be thus presented:—

Suppose a vertical circle to have its plane east and west (a luminous point, for the nonce), the sun in the meridian and 45° high. Then the shadow of the circle on a horizontal plane will clearly be a circle; and further, if a point move uniformly round the vertical circle, the shadow of the point will move uniformly round the shadow-circle. Now, let the centre of the vertical circle advance horizontally towards the south, while a point moves round its circumference at the same uniform rate. The moving point will describe a right helix with a thread-inclination of 45°. Its shadow will move uniformly round the shadow-circle while the centre of this circle advances uniformly and at the same rate in a straight line. It will therefore describe a cycloid.

It is obvious that all the varieties of curtate and prolate-cycloids may be obtained as projections of helices, by changing the thread-inclination.

Also it is obvious that if the sun (or the point of projection) were in the zenith, the shadow (or projection) of the helix first dealt with would be the curve called "the companion to the cycloid."

RICHARD A. PROCTOR

Is Blue a Primary Colour?

IN recent works on colour blue is called a primary colour. If blue is a primary colour a mixture of yellow and blue transparent pigments could not produce green, but would form an opaque combination. The colour produced by a mixture of yellow and blue pigments—if blue is an elementary colour—will depend on the colour reflected by the coloured layer itself, and not on the light passed through it from the white surface underneath. The brilliancy of the green produced by mixing yellow and blue pigment, is a measure of the transparency, to the green rays, of the blue pigment employed. Or in other words, there is as much green in the blue pigment employed, as there is green in the green produced by mixing that pigment with yellow. Blue must, therefore, be a compound colour, since the blue pigment passes the green rays.

Further. When the light reflected from blue substances is examined with a prism, it is found to be composed of green and violet. Again, when green and violet are combined by means of a rotating disc, blue is produced. By varying the proportions of green and violet any colour from green through blue-green or sea-green, blue, blue violet or indigo to violet, may be obtained. Again, when the solar spectrum is thrown on a blue surface, the green and the violet rays are reflected in the same way as a yellow surface reflects the red and the green rays.

The following is a simple way of showing that blue is not an elementary colour, and that violet is an elementary colour:—Take a piece of red, a piece of green, and a piece of violet

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glass. Any two of these form an opaque combination—that is to say, the first glass stops all the rays which could pass the second and the second stops all that pass the first. But a green and a blue glass do not form an opaque combination, but pass the green rays. If we place the red, the green, and the violet glasses in a row close to each other, with the green in the centre, place a piece of yellow glass so as to overlap the junction between the red and green glasses, and a piece of blue glass to overlap the junction between the green and violet glasses, and arrange the combination so that white light can pass through it, it will be seen that the yellow glass passes the red and green rays, and the blue glass passes the green and violet rays; and that the only effect of the yellow and blue glasses is to deepen the colours when the light passes through them.

Darrock, Falkirk, Sept. 23 JOHN AITKEN

Anthropology and M. Comte

PERHAPS you will allow me to state that your report of my paper "On the Anthropology of Auguste Comte," read before the British Association at Edinburgh, is wrong in two essential particulars. First, I did *not* attempt to "expound the views of M. Comte according to the principles laid down by Mr. Darwin." Comte's views on man and his relation to the animal kingdom were published upwards of twenty years ago; Mr. Darwin's recently. Second, I did *not* "maintain that Auguste Comte's worship of humanity would be the great doctrine of the future." I may, and do believe this, but I made no reference to it whatever in the paper which you have so correctly mis-reported. The Positive religion was not the subject of discussion, and I limited myself to what my paper implied. J. KAINES

3, Osborne Road, Stroud Green Lane, N., Sept. 22

A Plane's —— ?

IT is perhaps answering somewhat at cross purposes, but would not the word *aspect* meet Mr. Wilson's requirements? In reference to those important planes of every-day life, garden walls or house fronts, its use is well established; and there would be no violence to either custom or language in applying it to geometry. J. K. LAUGHTON

[Another correspondent suggests the term "slope."—ED.]

Meteorological Phenomenon

AMONGST some old memoranda I find the following, which I copy verbatim:— JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, Sept. 18

"Monkstown, near Dublin, about 3.10 P.M. 25th of July, 1858, saw, about opposite the sun, an appearance like the rainbow, but horizontal, and extending along a few degrees of the horizon. The red was above the sea-horizon, and the green below. I could not make out beyond the green, but this might be because the blue was blended with the colour of the sea. As I did not see it commence, I cannot say how long it lasted. It faded gradually but rapidly, without any other change in the sky that I saw. The day was alternate sunshine and heavy showers; the sun was shining at the time.

"This note has been made within half an hour after its disappearance."

Lunar Rainbow

A VERY perfect lunar rainbow was seen here last night. I noticed it first at 9.42. At that time the northern portion of it only was visible, but its intensity steadily increased, and by 9.45 the arch was complete. Both at the northern and southern extremities there was a peculiar glare, extending upwards about 20°, the apex of the arch being remarkably clear and well-defined. The rainbow faded away as rapidly as it had been developed, and at about 9.50 had entirely disappeared. At the time of the occurrence the western portion of the heavens was very clear, and the moon about 8° above the horizon. Temperature cold, with a biting wind from W.S.W. R. B.

Hinderton, Neston, Cheshire, Sept. 23

The Corona

MAY I suggest a method of observation which would possibly be a more delicate test than that which our own sight affords for ascertaining the outer limits of the corona?

It seems probable, from a discussion of former observations, that the polarisation of the sky is altogether changed during totality, and that instead of being radial to the sun as at other times, its plane is perpendicular, or nearly perpendicular, to the horizon. This appears at all events to be the case over a very large area about the eclipsed sun.

In passing along a parellel to the horizon through the sun's centre, we should expect to find, at some little distance from the limb, the pure atmospheric polarisation unaffected by any component due to the corona.

At such a point an observer using a Savart might therefore expect to find the bands disappear at an angle of 45° to the horizon. Having carefully turned out all trace of the bands upon the centre of his field, let him now pass onward towards the sun's limb (directing his attention all the time to the centre of his field only), when he there perceives the first trace of bands. He will know that the plane of polarisation has changed. If, on going backwards, the bands disappear again, while in passing onwards they continue to increase, he will know that that change is due to a component introduced by the corona; and he will be able to estimate the distance from the moon's limb at which such a component first became visible.

I feel disposed to think that by this method he will be able to trace the corona further than he could by the unaided eye; for it will be somewhat equivalent to making the corona shine upon a perfectly black back ground of sky; and much more than equivalent to accomplishing this with a Nicol only, for the Savart will detect less than one-eighth of the polarisation detectable by the Nicol.

The visible outer border of the corona is where our eye first distinguishes a difference between

The light of the sky
and
The light of the sky + the light of the corona,

while by this method the visible outer edge of the corona will be where we first distinguish a difference between an area of no polarisation and polarisation due to the corona.

In using a Savart with a large field, the central portion of the field might well be marked by fixing in the common focus of the telescope a plate of glass with a small circle etched upon it corresponding say to 8′ or 10′ of diameter in the field of view.

A. C. RANYARD

A Rare Moth

A FINE specimen of the rare moth *Deïopeia pulchella* (crimson speckled footman) was captured by R. Beck on the Moors near Scarborough on the 11th inst. Could any of the readers of NATURE inform me whether it has ever been taken so far north before? W. E. WALLER

Oliver's Mount School, Scarborough, Sept. 22

Meteorology in America

THE writer of the article on this subject may be interested in hearing that a meteorograph, similar in some respects to that invented by Prof. Hough, was sent to the International Exhibition just closed in London. It was invented and constructed in Sweden, and one similar is said to have been performing satisfactorily for nearly three years. In the Swedish, as in the American instrument, the height of the mercury in the barometer, and the wet and dry thermometers, is felt by steel wires descending the tubes; but in the Swedish instrument the levers to which these wires are attached are acted on by very fine screws, the revolutions of which, translated by a series of wheels into the language of barometers and thermometers, are printed every quarter of an hour on an endless roll of paper. The whole apparatus is set in motion by a galvanic battery, which even winds up the clock which regulates its own action. The barometer is tapped before it is registered, but there is no correction for temperature. The price is 350*l*.

The barometer invented by Prof. Wild seems to bear some resemblance to the barograph invented by Mr. King, and now used at the Liverpool Observatory. W. R.

Ruined Cities of Central America

IN the summary of the proceedings of the late meeting of the British Association, in the issue of NATURE for August 31, is an abstract of a paper by Captain L. Brine, R.N., *On the Ruined Cities of Central America.* The gallant captain is wrong in stating that the existence of these ruined cities was unknown

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